

Customer No.: 31561
Docket No.:11141-US-PA
Application No.: 10/605,402

REMARKS

Present Status of the Application

Claims 1-17 are objected to because there are insufficient antecedent basis in claims 1, 8-9, 11 and 13. The Office Action rejected claims 1, 3, 4 and 8-10 under 35 U.S.C. 102(b), as being anticipated by Leas (U.S. 6,037,210). The Office Action also rejected claim 7 under 35 U.S.C. 103(a) as being unpatentable over Leas. Claims 2, 5, 6, 11, 12-17 are allowable if rewritten to overcome the objections. Claims 18-22 are allowed.

Applicants have amended claims 1, 8, 9, 11, 13 to over the objections and the rejections. After entry of the foregoing amendments, claims 1-22 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Discussion of Office Action Objections

Claims 1, 11 are objected to because the term "a predetermined" is a not defined by the claims and the specification does not provide a standard for a determining the requisite degree. Applicants have canceled the term "a predetermined depth" in claims 1, 11 to overcome the objection.

Claim 8 is objected to because the limitation "bottom of the shallow trench" does not have sufficient antecedent basis. Applicants have amended claim 8 as the following to overcome the objection.

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Claim 8. A shallow trench isolation (STI) structure that defines an active area, comprising:

- a substrate having a shallow trench therein;
- a isolation layer disposed in the shallow trench; and
- a doped region as a channel stop layer disposed directly under the bottom of the shallow trench, wherein

the doped region does not extend to a sidewall of the shallow trench.

Claim 9 is objected to because the limitation "dopant" does not have sufficient antecedent basis. In claim 9, the term "dopant" is amended to "the doped region" to overcome the objection.

In claim 13, "serves" is amended to "serves as" to overcome the objection.

Discussion of Office Action Rejections

Applicants respectfully traverse the 102(b) rejection of claims 1, 3, 4 and 8-10 because Leas (U.S. 6,037,210) does not teach every element recited in these claims.

In order to properly anticipate Applicants' claimed invention under 35 U.S.C 102, each and every element of claim in issue must be found, "either expressly or inherently described, in a single prior art reference". "The identical invention must be shown in as complete details as is contained in the claim. Richardson v. Suzuki Motor Co., 868 F. 2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. 2131, 8th ed., 2001.

The present invention is in general related a method for fabricating a shallow trench isolation (STI) structure as claim 1 recites:

Claim 1. A method for fabricating a shallow trench isolation (STI) structure that defines an active area, comprising:

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forming a patterned mask layer on a substrate;
forming a doped region in the substrate exposed by the mask layer,
forming a shallow trench down to the doped region in the substrate after the doped region is formed; and
filing an insulating material into the shallow trench.

Leas fails to disclose, teach or suggest the feature of "forming a shallow trench down to the doped region in the substrate after the doped region is formed". In Leas's reference, as shown in Fig. 2, a pad nitride is formed on a substrate 31 and a trench 37 is formed in the substrate 31. And then, a buried plate 41 (used as a bottom electrode of a capacitor) is formed in the substrate 31 around the trench 37. Therefore, the buried plate 41 is formed after forming the trench 37. However, in claim 1 of the present invention, the doped region is formed in the substrate and then a shallow trench is formed down to the doped region in the substrate. Because the doped region is first formed in the substrate, it can be used as an etching stop layer (a detection end point of an etching process) when forming the shallow trench. Therefore, Leas does not teach every element recited in claim 1.

For at least the foregoing reasons, Applicants respectfully submit that independent claim 1 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 3-4 patently define over the prior art as well.

In addition, the present invention is also related to a shallow trench isolation (STI) structure as claim 8 recites:

Claim 8. A shallow trench isolation (STI) structure that defines an active area, comprising:

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a substrate having a shallow trench therein;
a isolation layer disposed in the shallow trench; and
*a doped region as a channel stop layer disposed directly under the bottom of the shallow trench, wherein
the doped region does not extend to a sidewall of the shallow trench.*

Leas also fails to disclose, teach or suggest the feature of "a doped region is disposed directly under the bottom of the shallow trench, and the doped region does not extend to a sidewall of the shallow trench". In Leas's reference, as shown in Figs. 3~7, the buried plate 41 is located in the substrate 31 around the trench 37. In other words, the buried plate 41 is formed under the bottom of the trench 37 and the buried plate 41 also extends to the sidewall of the shallow trench 37. However, in claim 8 of the present invention, the doped region is disposed directly under the bottom of the shallow trench, and the doped region does not extend to a sidewall of the shallow trench. Therefore, Leas does not teach every element recited in claim 8.

For at least the foregoing reasons, Applicants respectfully submit that independent claim 8 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 9-10 patently define over the prior art as well.

The Office Action rejected claim 7 under 35 U.S.C. 103(a), as being unpatentable over Leas (U.S. 6,037,210). Applicants respectfully traverse the rejections for at least the reasons set forth below.

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It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a combination of references, the cited combination of references must disclose, teach, or suggest, either implicitly or explicitly, all features of the claim at issue.

Applicants submit that, as disclosed above, Leas fails to teach or suggest each and every element of claim 1, from which claim 7 depends. Because independent claim 1 is allowable over the prior art of record, its dependent claim 7 is allowable as a matter of law, for at least the reason that dependent claim 7 contain all features of its respective independent claim 1.

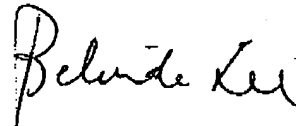
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CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

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